

What is claim d is:

1. A reciprocating compressor, comprising:

a crankshaft;

a connecting rod, one end thereof being to said crankshaft;

5 a crosshead, being connected with the other end of said connecting rod, as well as, a pair of intermediate shafts, each of which extends in opposing directions to each other;

a pair of plungers, each of which is connected to each of said intermediate plunger; and

10 cylinders, each receiving a tip portion of said plunger therein, wherein said pair of plungers moves reciprocally on almost same axis, and said crosshead is formed in one body.

2. A reciprocating compressor, as described in the claim 1, further comprising a crankcase for receiving said crankshaft, 15 said crosshead and said connecting rod therein, wherein on a side surface of said crankcase is formed an opening portion for installing or taking out said crankshaft.

3. A reciprocating compressor, as described in the claim 1, wherein gas compressed by one of said plungers is guided into 20 a compression space which is defined between the other of said plungers and one of said cylinder.

4. A reciprocating compressor, as described in the claim 1, wherein said connecting rod has a first member and a second member, being formed into two(2)-divided shape and linked with 25 said crankshaft, and a third member linked with a cross pin provided at a connection portion with said crosshead.

5. A reciprocating compressor, as described in the claim 1, wherein each of said pair of shafts has a large diametric guiding

portion for guiding said plunger to move reciprocally, and a small diametric portion located within said guide portion on a side of said plunger.

5 6. A reciprocating compressor, as described in the claim 1, wherein each of said pair of shafts has a guide portion for guiding said plunger to move reciprocally, and a seal ring is attached onto an outer periphery surface of said guide portion.

10 7. A reciprocating compressor, as described in the claim 1, wherein rod-packing seals, which are laminated in multiple-stages in an axial direction thereof, are provided on an outer periphery side of said each plunger, and said rod packing seals are divided into a high-pressure side seal portion and a low pressure side seal portion by conducting a middle portion of said rod packing seals in an axial direction thereof to a suction 15 flow passage of gas sucked into said compressor.

8. A reciprocating compressor, as described in the claim 7, wherein the rod packing of said low-pressure side seal portion includes a material, being softer than the rod packing of said high-pressure side seal portion.

20 9. A reciprocating compressor, as described in the claim 7, wherein the rod packing of said low-pressure side seal portion includes a resin material.

10. A reciprocating compressor of two stages, having:

a crankshaft; and

25 a pair of plungers, said plungers being disposed on sides opposing to each other, so as to put the crankshaft therebetween on a same axis thereof, wherein operating gas is compressed by converting rotating movement of said crankshaft into reciprocating movement of said pair of plungers, and further comprising:

30 rod packing seals, each being formed in multiple-stages in an axial direction thereof and disposed on an outer periphery

portions of each of said plungers;

cylinder rings, being disposed on said rod packing seals at a tip side of each of said plungers; and

5 cylinder cases, each being provided for covering an outer periphery portions of said rod packing seal and said cylinder ring, which are made to be almost same in an outer diameter thereof, wherein fine gap passages are formed between said cylinder case and an outer peripheries of said rod packing seals and said cylinder ring, conducting in an axial direction of said plunger, thereby 10 making up a leakage passage of the operating gas with said fine gas passages.

11. A reciprocating compressor, as described in the claim 10, wherein each of said fine gap passages is a groove for use of a nock pin for positioning in a peripheral direction.

15 12. A reciprocating compressor, as described in the claim 10, wherein other cylinder case is provided for fitting to said cylinder case on an outer periphery thereof, thereby forming a cooling jacket between said cylinder case and the other cylinder case.

20 13. A reciprocating compressor, as described in the claim 12, wherein flows either one of cooling water and cooling oil flows through said cooling jacket.

25 14. A reciprocating compressor, as described in the claim 10, wherein one of said plungers and said crankshaft are connected with each other through a connecting rod, a crosshead and a shaft, while other of said plungers is connected to said crosshead through other shaft.

30 15. A reciprocating compressor, as described in the claim 1, wherein the operating gas is high-pressure hydrogen gas, and discharge pressure of said compressor is equal to or large than 40 MPa and is equal to or lower than 84 MPa.

16. A reciprocating compressor, as described in the claim 15, wherein a filter means is provided at a discharge side of said compressor, for removing lubricating oil contained within the operating gas, which leaks out from said compressor.

5 17. A reciprocating compressor, as described in the claim 16, wherein the operating gas is high-pressure hydrogen gas, thereby supplying high-pressure hydrogen gas to a hydrogen gas containing means to be used in a fuel-cell car.